

IN THE CLAIMS:

Please enter the attached listing of claims into the application. This listing of claims replaces all prior listing of claims in the application.

LISTING OF CLAIMS

1-97. (Cancelled)

98. (Currently Amended) A sensor, comprising:
at least two conductive leads;
a sensing area comprising alternating regions of a doped or undoped conductive organic polymer material and an inorganic conductive material or carbon black ~~compositionally different than the conductive organic material~~ disposed between, and in contact with, the at least two conductive leads, wherein the regions of inorganic conductive ~~organic~~ material or carbon black are separated by about 10-1000 angstroms, wherein the sensing area provides an electrical path through the regions of the conductive organic polymer material and the ~~regions of the compositionally different inorganic~~ inorganic conductive material or carbon black, and wherein the sensing area is in direct contact with a vapor comprising an analyte to be detected, wherein the ~~compositionally different inorganic~~ inorganic conductive material is selected from the group consisting of an inorganic conductor, ~~a carbon black~~, and a mixed inorganic/organic conductor, wherein the inorganic conductor is a metal, a metal alloy, a metal oxide, a superconductor, or a combination thereof and wherein the inorganic conductor has an electrical conductivity that decreases as the temperature increase; and
an apparatus in electrical communication with the conductive leads for detecting a change in the sensing area between the at least two conductive leads when contacted with an analyte.

99. (Currently Amended) The sensor according to claim 98, wherein the conductive organic polymer material is selected from the group consisting of a polyaniline, an emeraldine salt of polyaniline, a polypyrrole, a polythiophene, a polyEDOT, and derivatives thereof.

~~400. (Cancelled) The sensor according to claim 98, wherein the compositionally different conductive material is carbon black.~~

101. (Previously Presented) The sensor according to claim 98, further comprising an insulator or plasticizer.

102. (Currently Amended) The sensor of claim 98, wherein the conductive organic polymer material is an emeraldine salt of polyaniline and the ~~compositionally different conductive material is~~ sensor comprises carbon black.

103. (Currently Amended) The sensor of claim 98, wherein the conductive organic polymer material is a doped polyaniline and the sensor comprises the ~~compositionally different conductive material is~~ carbon black.

104. (Currently Amended) A sensor, comprising:
at least two conductive leads;
a sensing area comprising alternating interpenetrating regions of a doped or undoped conductive organic polymer material and an inorganic conductive material or carbon black ~~compositionally different than the conductive organic material~~ disposed between and in contact with the at least two conductive leads, wherein the regions of inorganic conductive ~~organic~~ material or carbon black are separated by about 10-1000 angstroms, wherein the sensing area provides an electrical path through the regions of the conductive organic polymer material and the regions of the ~~compositionally different~~ inorganic conductive material or carbon black, and wherein the sensing area is in direct contact with a vapor comprising an analyte to be detected, wherein the ~~compositionally different~~ inorganic conductive material is selected from the group consisting of ~~an organic conductor, an organic complex,~~ an inorganic conductor and a mixed inorganic/organic conductor, wherein the inorganic conductor is a metal, a metal alloy, a metal oxide, or a superconductor, or a combination thereof and wherein the inorganic conductor has an electrical conductivity that decreases as the temperature increases; and

an apparatus in electrical communication with the conductive leads for detecting a change in the sensing area between the at least two conductive leads when contacted with an analyte.

105. (Currently Amended) A sensor, comprising:
- at least two conductive leads;
 - a sensing area comprising dispersed regions of a doped or undoped conductive organic polymer material and an inorganic conductive material or carbon black ~~compositionally different than the conductive organic material~~ wherein the dispersed regions provide interpenetrating regions of the conductive organic polymer material and an inorganic conductive material or carbon black ~~compositionally different than the conductive organic material~~, wherein the regions of inorganic conductive ~~organic~~ material or carbon black are separated by about 10-1000 angstroms, the sensing area disposed between and in contact with the at least two conductive leads, wherein the sensing area provides an electrical path through the regions of the conductive organic polymer material and the regions of the ~~compositionally different~~ inorganic conductive material or carbon black, and wherein the sensing area is in direct contact with a vapor comprising an analyte to be detected, wherein the ~~compositionally different~~ inorganic conductive material is selected from the group consisting of an organic conductor, an organic complex, an inorganic conductor and a mixed inorganic/organic conductor, wherein the inorganic conductor is a metal, a metal alloy, a metal oxide, or a superconductor, or a combination thereof and wherein the inorganic conductor has an electrical conductivity that decreases as the temperature increases; and
 - an apparatus in electrical communication with the conductive leads for detecting a change in the sensing area between the at least two conductive leads when contacted with an analyte.

106. (Currently Amended) A sensor, comprising:
- at least two conductive leads;
 - a sensing area comprising alternating interpenetrating regions of a doped or undoped polyaniline or an emeraldine salt of polyaniline and an inorganic conductive

material compositionally different than the polyaniline or emeraldine salt of polyaniline disposed between, and in contact with, the at least two conductive leads, wherein the regions of the inorganic conductive organic material or carbon black are separated by about 10-1000 angstroms, wherein the sensing area provides an electrical path through the alternating interpenetrating regions of polyaniline or emeraldine salt of polyaniline and the inorganic conductive material compositionally different than the polyaniline or emeraldine salt of polyaniline; and

an apparatus in electrical communication with the conductive leads for detecting a change in the sensing area between the at least two conductive leads when contacted with an analyte.

107. (Currently Amended) The sensor of claim 106, wherein the inorganic conductive material compositionally different than the polyaniline or emeraldine salt of polyaniline is selected from the group consisting of an organic conductor, an organic complex, an inorganic conductor, and a mixed inorganic/organic conductor, wherein the inorganic conductor is a metal, a metal alloy, a metal oxide, an oxidized metal, a superconductor, and any combination thereof.

108. (Currently Amended) A sensor array comprising:
a plurality of sensors, wherein at least one sensor comprises:
at least two conductive leads;
a sensing area comprising alternating interpenetrating regions of a doped or undoped conductive organic polymer material and an inorganic conductive material or carbon black compositionally different than the conductive organic material disposed between and in contact with the at least two conductive leads, wherein the regions of inorganic conductive organic material or carbon black are separated by about 10-1000 angstroms, wherein the sensing area provides an electrical path through the alternating interpenetrating regions of the conductive organic polymer material and the regions of the compositionally different inorganic conductive material or carbon black, wherein the sensing area is in direct contact with a vapor comprising an analyte to be detected, wherein the compositionally different inorganic conductive material is selected from the group consisting of an organic conductor, an

~~organic complex~~, an inorganic conductor and a mixed inorganic/organic conductor, wherein the inorganic conductor is a metal, a metal alloy, a metal oxide, or a superconductor, or a combination thereof and wherein the inorganic conductor has an electrical conductivity that decreases as the temperature increases.

109. (Currently Amended) The sensor array according to claim 108, wherein the sensor array comprises a plurality of sensors each comprising regions of a conductive organic polymer material and regions of ~~an inorganic~~ conductive material ~~or carbon black compositionally different than the conductive organic material~~ wherein the conductive organic polymer material of at least one sensor is different from the conductive organic polymer material of at least one other sensor.

~~110. (Cancelled) The sensor array according to claim 108, wherein the compositionally different conductive material is an inorganic conductor.~~

111. (Cancelled)

112. (Currently Amended) The sensor array according to claim 159, wherein the conductive organic polymer material of one sensor of the plurality of sensors is compositionally different than at least one other sensor of the plurality of sensors.

113. (Currently Amended) The sensor array according to claim 108, wherein the conductive organic polymer material is selected from the group consisting of a polyaniline, an emeraldine salt of polyaniline, a polypyrrole, a polythiophene, and a polyEDOT, and the inorganic conductive material ~~compositionally different than the conductive organic material~~ is selected from the group consisting of Ag, Au, Cu, Pt, ~~carbon black~~, and AuCu.

114. (Previously Presented) The sensor array according to claim 108 or 113, further comprising a temperature control apparatus in thermal communication with at least one sensor.

115. (Previously Presented) The sensor array according to claim 108 or 113, further comprising an apparatus for detecting a change selected from the group consisting of resistance, conductance, impedance, and capacitance in the electrical properties of at least one sensor.

116. (Previously Presented) The sensor array according to claim 115, further comprising a temperature control apparatus in thermal communication with at least one sensor.

117. (Currently Amended) The sensor array according to claim ~~440~~ 108, wherein the inorganic ~~conductor~~ conductive material is selected from the group consisting of Ag, Au, Cu, Pt, and AuCu.

118. (Currently Amended) The sensor array according to claim 108, wherein the ~~compositionally different conductive material~~ is sensor comprises carbon black.

119. (Cancelled).

120. (Cancelled).

121. (Currently Amended) The sensor array according to claim 108, wherein the inorganic conductive material ~~compositionally different than the conductive organic material~~ is a member selected from the group consisting of a metal, a metal alloy, a metal oxide, an organic complex, a superconductor, and a mixed inorganic/organic conductor.

122. (Currently Amended) The sensor array according to claim 108, wherein the ~~compositionally different~~ inorganic conductive material is a particle.

123-125. (Cancelled)

126. (Currently Amended) A sensor array comprising:
- a plurality of sensors, wherein at least one sensor comprises:
 - at least two conductive leads;
 - a sensing area comprising alternating interpenetrating regions of a doped or undoped conductive organic polymer material and an inorganic conductive material or carbon black compositionally different than the conductive organic material disposed between, and in contact with, the at least two conductive leads, wherein the regions of inorganic conductive organic material or carbon black are separated by about 10-1000 angstroms, wherein the sensing area provides an electrical path through the regions of the conductive organic polymer material and the regions of the compositionally different inorganic conductive material or carbon black, wherein the sensing area is in direct contact with a vapor comprising an analyte to be detected, wherein the compositionally different inorganic conductive material is selected from the group consisting of an organic conductor, an organic complex, an inorganic conductor, and a mixed inorganic/organic conductor, wherein the inorganic conductor is a metal a metal alloy, a metal oxide, a superconductor, or a combination thereof, wherein the inorganic conductor has an electrical conductivity that decreases as the temperature increases; and
 - a measuring apparatus electrically coupled to the at least two conductive leads for detecting a change in the sensing area when contacted with an analyte.
127. (Currently Amended) A sensor array comprising:
- a plurality of sensor wherein at least one sensor comprise alternating interpenetrating regions of a doped or undoped conductive organic polymer material and regions of an inorganic compositionally different conductive material or carbon black wherein the sensors are in direct contact with a vapor comprising an analyte to be detected, wherein the regions of inorganic conductive organic material or carbon black are separated by about 10-1000 angstroms, wherein the compositionally different inorganic conductive material is selected from the group consisting of an organic conductor, an organic complex, an inorganic conductor, and a mixed inorganic/organic conductor, wherein the inorganic conductor is a metal a metal alloy, a metal oxide, a superconductor, or a combination thereof, wherein the

inorganic conductor has an electrical conductivity that decreases as the temperature increases; and

means, electrically coupled to the plurality of sensors, for detecting a change in the plurality of sensors when contacted with an analyte.

128. (Currently Amended) A sensor array system comprising:
- a plurality of sensors, wherein at least one sensor comprises:
 - at least two conductive leads;
 - a sensing area comprising alternating interpenetrating regions of a doped or undoped conductive organic polymer material and an inorganic conductive material ~~or carbon black compositionally different than the conductive organic material~~ disposed between and in contact with the at least two conductive leads, wherein the regions of inorganic conductive ~~organic material~~ or carbon black are separated by about 10-1000 angstroms, wherein the sensing area provides an electrical path through the regions of the conductive organic polymer material and the regions of the ~~compositionally different~~ inorganic conductive material or carbon black, wherein the sensing area is in direct contact with a vapor comprising an analyte to be detected, wherein the ~~compositionally different~~ inorganic conductive material is selected from the group consisting of ~~an organic conductor, an organic complex,~~ an inorganic conductor and a mixed inorganic/organic conductor, wherein the inorganic conductor is a metal, a metal alloy, a metal oxide, or a superconductor or a combination thereof and wherein the inorganic conductor has an electrical conductivity that decreases as the temperature increases;
 - a measuring apparatus that detects a change in the electrical properties of the at least one sensor, wherein at least one sensor is in communication with the measuring apparatus; and
 - a computer comprising a resident algorithm, wherein the computer processes the change in the electrical properties.

129. (Previously Presented) The sensor array system according to claim 128, wherein the measuring apparatus is an electrical measuring device.

130. (Currently Amended) The sensor array system according to claim 128, wherein the ~~compositionally different~~ inorganic conductive material is an inorganic conductor.

131. (Currently Amended) The sensor array system according to claim 128, wherein the plurality of sensors each comprise regions of a conductive organic polymer material and regions of an inorganic conductive material or carbon black ~~compositionally different than the conductive organic material~~.

132. (Currently Amended) The sensor array system according to claim 131, wherein the conductive organic polymer material of at least one sensor is different from the conductive organic polymer material of at least one other sensor.

133. (Currently Amended) The sensor array system according to claim 131, wherein the conductive organic polymer material of the plurality of sensors are compositionally the same.

134. (Previously Presented) The sensor array system according to claim 128, wherein the change in electrical properties is selected from the group consisting of impedance, conductance, capacitance, inductance, and resistance in the sensors.

135. (Currently Amended) The sensor array system according to claim 128, wherein the conductive organic polymer material is selected from the group consisting of a polyaniline, an emeraldine salt of polyaniline, a polypyrrole, a polythiophene, and a polyEDOT, and the inorganic conductive material ~~compositionally different than the conductive organic material~~ is selected from the group consisting of Ag, Au, Cu, Pt, ~~carbon black~~, and AuCu.

136. (Previously Presented) The sensor array system according to claim 128 or 135, further comprising a temperature control apparatus in thermal communication with at least one sensor.

137. (Previously Presented) The sensor array system according to claim 128 or 135, wherein the change in electrical properties is a change in an electrical impedance.

138. (Previously Presented) The sensor array system according to claim 137, further comprising a temperature control apparatus in thermal communication with at least one sensor.

139. (Currently Amended) The sensor array system according to claim 130, wherein the inorganic conductive material ~~conductor~~ is a member selected from the group consisting of Ag, Au, Cu, Pt, and AuCu.

140. (Currently Amended) The sensor array system according to claim 128, wherein the sensor comprises ~~compositionally different conductive material~~ is carbon black.

141. (Cancelled).

142. (Currently Amended) The sensor array system according to claim 128, wherein the inorganic ~~conductive material compositionally different than the~~ ~~conductive organic material~~ is selected from the group consisting of an organic conductor, an inorganic conductor, and a mixed inorganic/organic conductor.

143. (Currently Amended) The sensor array system according to claim 128, wherein the inorganic ~~conductive material compositionally different than the~~ ~~conductive organic material~~ is selected from the group consisting of a metal, a metal alloy, a metal oxide, ~~an organic complex~~, a superconductor, and a mixed inorganic/organic conductor.

144. (Currently Amended) The sensor array system according to claim 128, wherein the ~~compositionally different~~ inorganic conductive material is a particle.

145. (Currently Amended) The sensor array system according to claim 128, wherein each of the sensors comprises a conductive organic polymer material.

146. (Cancelled).

147. (Previously Presented) The sensor array system according to claim 128, wherein the resident algorithm is a member selected from the group consisting of principal component analysis, Fisher linear analysis, neural networks, genetic algorithms, fuzzy logic, pattern recognition, and combinations thereof.

148. (Currently Amended) A system for identifying a microorganism, the system comprising:
a measuring apparatus;
a sensor array comprising a plurality of sensors in communication with the measuring apparatus, wherein at least one sensor comprises:
at least two conductive leads;
a sensing area comprising alternating regions of a doped or undoped conductive organic polymer material and an inorganic conductive material or carbon black ~~compositionally different than the conductive organic material~~ disposed between and in electrical communication with the at least two conductive leads, wherein the regions of inorganic conductive ~~organic~~ material or carbon black are separated by about 10-1000 angstroms, wherein the ~~compositionally different~~ inorganic conductive material is selected from the group consisting of an ~~organic conductor, an organic complex,~~ an inorganic conductor, and a mixed inorganic/organic conductor, wherein the inorganic conductor is a metal a metal alloy, a metal oxide, a superconductor, or a combination thereof, wherein the inorganic conductor has an electrical conductivity that decreases as the temperature increases, wherein the sensing area provides an electrical path through the regions of the conductive organic polymer material and the regions of the ~~compositionally different~~ inorganic conductive material or carbon black, and wherein the sensing area is in direct contact with a vapor comprising a biomarker to be detected; and
a computer comprising a resident algorithm;

wherein the measuring apparatus is capable of detecting a response from each sensor in the array wherein the response are indicative of the presence of a biomarker of a microorganism and the computer is capable of assembling the responses into a response profile whereby the computer associates the response profile indicative of the biomarker with a microorganism for microorganism identification.

149. (Previously Presented) The system for identifying a microorganism in accordance with claim 148, wherein the resident algorithm of the computer is a member selected from the group consisting of principal component analysis, Fisher linear analysis, neural networks, genetic algorithms, fuzzy logic, pattern recognition, and combinations thereof.

150. (Previously Presented) The system for identifying a microorganism in accordance with claim 148, further comprising the steps of:
providing an information storage device coupled to the measuring apparatus;
and
storing information in the information storage device.

151. (Previously Presented) The system for identifying a microorganism in accordance with claim 148, wherein the measuring apparatus includes a digital-analog converter.

152. (Currently Amended) A system for detecting an analyte in a sample, comprising:
a substrate having a plurality of sensors wherein at least one sensor comprises:
at least two conductive leads;
a sensing area comprising alternating interpenetrating regions of a doped or undoped conductive organic polymer material and an inorganic conductive material or carbon black ~~compositionally different than the conductive organic material~~
disposed between, and in contact with, the at least two conductive leads, wherein

the regions of ~~inorganic~~ conductive ~~organic~~ material ~~or carbon black~~ are separated by about 10-1000 angstroms, wherein the sensing area provides an electrical path through the regions of the conductive organic ~~polymer~~ material and the regions of the ~~compositionally different inorganic~~ conductive material ~~or carbon black~~ such that the at least one sensor provides a response that varies according to the presence of an analyte in contact with it, wherein the sensing area is in direct contact with a vapor comprising an analyte to be detected, wherein the ~~inorganic compositionally different~~ conductive material is selected from the group consisting of an ~~organic conductor, an organic complex,~~ an inorganic conductor and a mixed inorganic/organic conductor, wherein the inorganic conductor is a metal, a metal alloy, a metal oxide, or a superconductor, or a combination thereof and wherein the inorganic conductor has an electrical conductivity that decreases as the temperature increases;

a detector operatively associated with the plurality of sensors, for measuring the response of the plurality of sensor when contacted with the sample;

a sample delivery unit for delivering the sample to be tested to the plurality of sensors; and

an information storage and processing device configured to store an ideal response for a predetermined analyte and to compare the response of the plurality of sensor with the stored ideal response, to detect the presence of the analyte in the sample.

153. (Previously Presented) The system in accordance with claim 152, wherein the information storage and processing device is configured to store ideal responses for a plurality of predetermined analytes; and

the information storage and processing device further is configured to compare the response of the plurality of sensors with the plurality of stored ideal responses, to detect the presence of each analyte in the sample.

154. (Previously Presented) The system in accordance with claim 152, wherein the sample is a liquid and the sample delivery unit comprises:

a flow passage interconnecting the substrate comprising the plurality of sensor with a mixture containing the liquid;

a gas-permeable, liquid-impermeable shield interposed in the flow passage; and

a device for extracting vapor from the liquid and for delivering the extracted vapor along the flow passage to the substrate comprising the plurality of sensors via the flow passage.

155. (Previously Presented) The system in accordance with claim 152, wherein the sample is gaseous and the sample delivery unit comprises:

a gas flow passage; and

a pump for pumping the gaseous sample to the substrate comprising the plurality of sensors via the gas flow passage.

156. (Previously Presented) The system in accordance with claim 152, wherein the sample is a vapor extracted from a solid and the sample delivery unit comprises:

a vapor flow passage; and

a pump for pumping the vapor extracted from the solid to the substrate comprising the plurality of sensors via the vapor flow passage.

157. (Previously Presented) The system in accordance with claim 152, wherein the detector detects a member selected from the group consisting of electromagnetic energy, optical properties, resistance, capacitance, inductance, impedance, and combinations thereof.

158. (Previously Presented) The system in accordance with claim 152, wherein at least one other sensor or the plurality of sensors comprises a member selected from the group consisting of a surface acoustic wave sensor; a quartz microbalance sensor; a conductive composite; a chemiresistor; a metal oxide gas sensor; a conducting polymer sensor; a dye-impregnated polymer film on fiber optic detector; a polymer-coated micromirror; an electrochemical gas detector; a chemically sensitive

field-effect transistor; a carbon black-polymer composite; a micro-electro-mechanical system device; and a micro-opto-electro-mechanical system device.

159. (Currently Amended) The sensor array of claim 108, wherein the plurality of sensors comprise at least two conductive leads and a sensing area comprising alternating interpenetrating regions of a conductive organic polymer material and an inorganic conductive material or carbon black compositionally different than the conductive organic material disposed between and in electrical communication with the at least two conductive leads.